

**ATTACHMENT II**  
**DYNAMIC STABILITY STUDY RESULTS**  
**ALTERNATIVE AC 1, OFF-PEAK CONDITIONS**

ALTERNATIVE AC-1 OFF PEAK

Second Paloverde-Devers 500 kV line (Harquahala-Devers),  
 Ramona 500 kV Substation, Imperial Valley-Ramona 500 kV line  
 Reactive Support (added for dynamic stability in bold font):

Shunts (static support):

|                            |                                   |
|----------------------------|-----------------------------------|
| 2X43 MVAR SOUTH BAY 138 KV | 1X79 MVAR SAN BERNARDINO 230 KV   |
| 2X79 MVAR BARRE 230 KV     | 2X79 MVAR VISTA 230 KV            |
| 1X79 MVAR MIRA LOMA 230 KV | 1X79 MVAR COACHELLA VALLEY 230 KV |
| 3X79MVAR DEVERS 230 KV     |                                   |

Dynamic Support:

400 MVAR STATCON or SVC (SYNCHR.COND) ON DEVERS 500 KV  
 200 MVAR SVC (SYNCHR.COND) ON VALLEY 500 KV  
**300 MVAR STATCON on Devers 115 kV**  
**100 MVAR SVC on Wiltmonhr 161 kV**

1. Devers-Valley 500 kV outage, fault on Devers

No violations

HIGHEST VOLTAGE DIP

| AREA | BUS NAME | BUS KV | TYPE |  | Initial | MaxDip | Prct | @time |
|------|----------|--------|------|--|---------|--------|------|-------|
| 24   | SANBRDNO | 66     | vbul |  | 1.044   | 0.934  | 10.6 | 0.221 |
| 24   | P120_A   | 230    | vbus |  | 0.97    | 0.87   | 10.3 | 0.221 |
| 24   | VSTA     | 66     | vbug |  | 1.011   | 0.912  | 9.8  | 0.221 |

LOWEST FREQUENCY

| AREA | BUS NAME | BUS KV | TYPE |  | MaxDip | @time |
|------|----------|--------|------|--|--------|-------|
| 24   | HI DESER | 115    | fbul |  | 59.638 | 0.042 |
| 24   | TAP805   | 115    | fbus |  | 59.642 | 0.042 |
| 24   | ESRP P1  | 6.9    | fbug |  | 59.57  | 0.067 |

2. Eldorado-McCullough 500 kV outage, fault on Eldorado

No violations

HIGHEST VOLTAGE DIP

| AREA | BUS NAME | BUS KV | TYPE |  | Initial | MaxDip | Prct | @time |
|------|----------|--------|------|--|---------|--------|------|-------|
| 26   | WLMNTNLD | 138    | vbul |  | 1.013   | 0.817  | 19.4 | 0.213 |
| 26   | HARB     | 138    | vbus |  | 1.013   | 0.817  | 19.4 | 0.213 |
| 26   | ADELSVC  | 500    | vbug |  | 1.031   | 0.863  | 16.3 | 0.213 |

LOWEST FREQUENCY

| AREA | BUS NAME | BUS KV | TYPE |  | MaxDip | @time |
|------|----------|--------|------|--|--------|-------|
| 26   | WLMNTNLD | 138    | fbul |  | 59.46  | 0.067 |
| 26   | HARB     | 138    | fbus |  | 59.46  | 0.067 |
| 26   | HARB1G   | 13.8   | fbug |  | 59.46  | 0.067 |

3. Eldorado-Mohave 500 kV, fault on Eldorado

No violations

HIGHEST VOLTAGE DIP

| AREA | BUS NAME | BUS KV | TYPE |  | Initial | MaxDip | Prct | @time |
|------|----------|--------|------|--|---------|--------|------|-------|
| 26   | WLMNTNLD | 138    | vbul |  | 1.013   | 0.805  | 20.5 | 0.213 |
| 26   | HARB     | 138    | vbus |  | 1.013   | 0.806  | 20.5 | 0.213 |
| 26   | ADELSVC  | 500    | vbug |  | 1.031   | 0.849  | 17.7 | 0.25  |

LOWEST FREQUENCY

| AREA | BUS NAME | BUS KV | TYPE |  | MaxDip | @time |
|------|----------|--------|------|--|--------|-------|
| 26   | WLMNTNLD | 138    | fbul |  | 59.46  | 0.067 |
| 26   | HARB     | 138    | fbus |  | 59.46  | 0.067 |
| 26   | HARB1G   | 13.8   | fbug |  | 59.46  | 0.067 |

4. Eldorado-Moenkopi 500 kV, fault on Eldorado

No violations

HIGHEST VOLTAGE DIP

| AREA | BUS NAME | BUS KV | TYPE |  | Initial | MaxDip | Prct | @time |
|------|----------|--------|------|--|---------|--------|------|-------|
| 26   | WLMNTNLD | 138    | vbul |  | 1.013   | 0.817  | 19.4 | 0.213 |
| 26   | HARB     | 138    | vbus |  | 1.013   | 0.817  | 19.4 | 0.213 |
| 26   | ADELSVC  | 500    | vbug |  | 1.031   | 0.859  | 16.7 | 0.213 |

LOWEST FREQUENCY

| AREA | BUS NAME | BUS KV | TYPE |  | MaxDip | @time |
|------|----------|--------|------|--|--------|-------|
| 26   | WLMNTNLD | 138    | fbul |  | 59.46  | 0.067 |
| 26   | HARB     | 138    | fbus |  | 59.46  | 0.067 |
| 26   | HARB1G   | 13.8   | fbug |  | 59.46  | 0.067 |

5. Imperial Valley-North Gila 500 kV, fault on N.Gila

No violations

HIGHEST VOLTAGE DIP

| AREA | BUS NAME | BUS KV | TYPE |  | Initial | MaxDip | Prct | @time |
|------|----------|--------|------|--|---------|--------|------|-------|
| 24   | VALLEY-S | 115    | vbul |  | 1.026   | 0.826  | 19.5 | 1.121 |
| 24   | DEVERS   | 230    | vbus |  | 1.019   | 0.832  | 18.4 | 1.121 |
| 24   | DEVERS   | 500    | vbug |  | 1.043   | 0.834  | 20.1 | 1.121 |

LOWEST FREQUENCY

| AREA | BUS NAME | BUS KV | TYPE |  | MaxDip | @time |
|------|----------|--------|------|--|--------|-------|
| 20   | CPU-161  | 161    | fbul |  | 59.635 | 0.558 |
| 20   | CPT-161  | 161    | fbus |  | 59.633 | 0.558 |
| 20   | CPT-U3   | 13.8   | fbug |  | 59.601 | 0.558 |

6. Imperial Valley-Miguel 500 kV, fault on Imperial Valley, trip Imperial Valley generation as RAS

No violations

HIGHEST VOLTAGE DIP

| AREA | BUS NAME | BUS KV | TYPE |  | Initial | MaxDip | Prct | @time |
|------|----------|--------|------|--|---------|--------|------|-------|
| 20   | CTA-69   | 69     | vbul |  | 1.009   | 0.92   | 8.8  | 0.238 |
| 20   | HRD-230  | 230    | vbus |  | 0.984   | 0.897  | 8.8  | 0.225 |
| 22   | SYCAMORE | 230    | vbug |  | 1.003   | 0.924  | 7.8  | 0.225 |

LOWEST FREQUENCY

| AREA | BUS NAME | BUS KV | TYPE |  | MaxDip | @time |
|------|----------|--------|------|--|--------|-------|
| 22   | GRANITE  | 69     | fbul |  | 59.746 | 0.042 |
| 22   | CALPK_EC | 69     | fbus |  | 59.757 | 0.042 |
| 22   | CALPK_EC | 13.8   | fbug |  | 59.757 | 0.042 |

7. Imperial Valley-Ramona 500 kV, fault on Imperial Valley

No violations

HIGHEST VOLTAGE DIP

| AREA | BUS NAME | BUS KV | TYPE |  | Initial | MaxDip | Prct | @time |
|------|----------|--------|------|--|---------|--------|------|-------|
| 22   | BORDER   | 69     | vbul |  | 1.028   | 0.956  | 7    | 0.221 |
| 22   | CALPK_BD | 69     | vbus |  | 1.028   | 0.956  | 7    | 0.221 |
| 22   | OTAY     | 69     | vbug |  | 1.024   | 0.954  | 6.9  | 0.221 |

LOWEST FREQUENCY

| AREA | BUS NAME | BUS KV | TYPE |  | MaxDip | @time |
|------|----------|--------|------|--|--------|-------|
| 22   | GRANITE  | 69     | fbul |  | 59.746 | 0.042 |
| 22   | CALPK_EC | 69     | fbus |  | 59.757 | 0.042 |

|    |          |      |      |  |        |       |
|----|----------|------|------|--|--------|-------|
| 22 | CALPK_EC | 13.8 | fbug |  | 59.757 | 0.042 |
|----|----------|------|------|--|--------|-------|

8. Intermountain-Adelanto DC line, no fault

No violations

HIGHEST VOLTAGE DIP

| AREA | BUS NAME | BUS KV | TYPE |  | Initial | MaxDip | Prct | @time |
|------|----------|--------|------|--|---------|--------|------|-------|
| 65   | MIDDLETN | 69     | vbul |  | 1.023   | 0.963  | 5.9  | 0.438 |
| 65   | MIDDLETN | 138    | vbus |  | 1.021   | 0.962  | 5.8  | 0.438 |
| 65   | TWCITIES | 69     | vbug |  | 1.034   | 0.975  | 5.8  | 0.438 |

LOWEST FREQUENCY

| AREA | BUS NAME | BUS KV | TYPE |  | MaxDip | @time |
|------|----------|--------|------|--|--------|-------|
| 65   | MILFORD  | 46     | fbul |  | 59.78  | 1.938 |
| 65   | BLUNDELL | 46     | fbus |  | 59.754 | 1.938 |
| 65   | BLNDL G1 | 12.5   | fbug |  | 59.72  | 1.938 |

9. Lugo-Eldorado, Lugo-Mohave 500 kV double outage, fault at Lugo

No violations. Delayed voltage recovery.

VOLTAGE CRITERIA VIOLATIONS

| AREA | BUS NAME | BUS KV | TYPE | Initial | MaxDip | Prct | @time | Cycles | From  | To    |
|------|----------|--------|------|---------|--------|------|-------|--------|-------|-------|
| 24   | AMERON   | 66     | vbul | 1.022   |        |      |       | 45     | 0.213 | 0.963 |
| 24   | PADUA    | 66     | vbul | 1.042   |        |      |       | 45     | 0.213 | 0.963 |
| 24   | MIRALOMA | 66     | vbul | 1.008   |        |      |       | 42.7   | 0.213 | 0.925 |
| 24   | SANBRDNO | 66     | vbul | 1.044   |        |      |       | 49.5   | 0.213 | 1.038 |
| 24   | VALLEY-S | 115    | vbul | 1.026   |        |      |       | 51.8   | 0.213 | 1.075 |
| 24   | HIDESERT | 230    | vbus | 1       | 0.7    | 30   | 0.4   |        |       |       |
| 24   | VICTOR   | 230    | vbus | 1.006   | 0.704  | 30   | 0.4   |        |       |       |
| 24   | VICTOR   | 115    | vbul | 1.035   |        |      |       | 40.5   | 0.213 | 0.888 |
| 24   | VICTOR   | 115    | vbul | 1.035   | 0.719  | 30.5 | 0.4   |        |       |       |
| 24   | APPLEVAL | 115    | vbul | 1.027   |        |      |       | 40.5   | 0.213 | 0.888 |
| 24   | APPLEVAL | 115    | vbul | 1.027   | 0.707  | 31.2 | 0.4   |        |       |       |
| 24   | AQUEDUCT | 115    | vbul | 1.029   |        |      |       | 40.5   | 0.213 | 0.888 |
| 24   | AQUEDUCT | 115    | vbul | 1.029   | 0.713  | 30.8 | 0.4   |        |       |       |
| 24   | HESPERIA | 115    | vbul | 1.028   |        |      |       | 40.5   | 0.213 | 0.888 |
| 24   | HESPERIA | 115    | vbul | 1.028   | 0.71   | 30.9 | 0.4   |        |       |       |
| 24   | PHELAN   | 115    | vbul | 1.031   |        |      |       | 40.5   | 0.213 | 0.888 |
| 24   | PHELAN   | 115    | vbul | 1.031   | 0.715  | 30.7 | 0.4   |        |       |       |
| 24   | ROADWAY  | 115    | vbul | 1.029   |        |      |       | 40.5   | 0.213 | 0.888 |

VOLTAGE CRITERIA VIOLATIONS

| AREA | BUS NAME | BUS KV | TYPE | Initial | MaxDip | Prct | @time | Cycles | From  | To    |
|------|----------|--------|------|---------|--------|------|-------|--------|-------|-------|
| 24   | ROADWAY  | 115    | vbul | 1.029   | 0.719  | 30.1 | 0.44  |        |       |       |
| 24   | SAVAGE   | 115    | vbul | 1.028   |        |      |       | 40.5   | 0.213 | 0.888 |
| 24   | SAVAGE   | 115    | vbul | 1.028   | 0.709  | 31   | 0.4   |        |       |       |
| 24   | AFG IND  | 115    | vbul | 1.028   |        |      |       | 40.5   | 0.213 | 0.888 |
| 24   | AFG IND  | 115    | vbul | 1.028   | 0.709  | 31   | 0.4   |        |       |       |
| 24   | BLKMTN   | 115    | vbul | 1.017   |        |      |       | 40.5   | 0.213 | 0.888 |
| 24   | BLKMTN   | 115    | vbul | 1.017   | 0.7    | 31.2 | 0.4   |        |       |       |
| 24   | PLEUSS   | 115    | vbul | 1.029   |        |      |       | 40.5   | 0.213 | 0.888 |
| 24   | PLEUSS   | 115    | vbul | 1.029   | 0.708  | 31.2 | 0.44  |        |       |       |
| 24   | SOPPORT  | 115    | vbul | 1.026   |        |      |       | 40.5   | 0.213 | 0.888 |
| 24   | SOPPORT  | 115    | vbul | 1.026   | 0.71   | 30.8 | 0.4   |        |       |       |
| 24   | COTNWD   | 115    | vbul | 1.047   |        |      |       | 42.7   | 0.213 | 0.925 |
| 24   | COTNWD   | 115    | vbul | 1.047   | 0.712  | 32   | 0.44  |        |       |       |
| 24   | TAP601   | 115    | vbus | 1.029   | 0.719  | 30.1 | 0.44  |        |       |       |
| 24   | TAP602   | 115    | vbus | 1.026   | 0.71   | 30.8 | 0.4   |        |       |       |
| 24   | TAP603   | 115    | vbus | 1.019   | 0.702  | 31.1 | 0.4   |        |       |       |
| 24   | TAP604   | 115    | vbus | 1.029   | 0.708  | 31.2 | 0.44  |        |       |       |
| 24   | TAP605   | 115    | vbus | 1.028   | 0.707  | 31.2 | 0.4   |        |       |       |
| 24   | TAP606   | 115    | vbus | 1.028   | 0.71   | 30.9 | 0.4   |        |       |       |
| 24   | TAP607   | 115    | vbus | 1.029   | 0.713  | 30.8 | 0.4   |        |       |       |
| 24   | TAP608   | 115    | vbus | 1.031   | 0.715  | 30.7 | 0.4   |        |       |       |
| 24   | PERMANTE | 115    | vbul | 1.046   |        |      |       | 42.7   | 0.213 | 0.925 |
| 24   | PERMANTE | 115    | vbul | 1.046   | 0.711  | 32   | 0.44  |        |       |       |
| 24   | GOLDHILS | 115    | vbul | 1.046   |        |      |       | 42.7   | 0.213 | 0.925 |
| 24   | GOLDHILS | 115    | vbul | 1.046   | 0.711  | 32   | 0.44  |        |       |       |
| 24   | VSTA     | 66     | vbug | 1.011   |        |      |       | 45     | 0.213 | 0.963 |
| 26   | ADELANTO | 500    | vbus | 1.031   | 0.721  | 30.1 | 0.33  |        |       |       |
| 26   | GLENDAL  | 230    | vbul | 1.017   |        |      |       | 49.5   | 0.213 | 1.038 |
| 26   | GLENDAL  | 230    | vbul | 1.017   | 0.672  | 34   | 0.21  |        |       |       |
| 26   | GRAMERC1 | 138    | vbus | 1.02    | 0.656  | 35.7 | 0.21  |        |       |       |
| 26   | GRAMERC2 | 138    | vbus | 1.02    | 0.656  | 35.7 | 0.21  |        |       |       |
| 26   | HALLDALE | 138    | vbul | 1.015   |        |      |       | 51.8   | 0.213 | 1.075 |
| 26   | HALLDALE | 138    | vbul | 1.015   | 0.647  | 36.2 | 0.21  |        |       |       |
| 26   | HARB     | 138    | vbus | 1.013   | 0.634  | 37.4 | 0.21  |        |       |       |
| 26   | HAYNES   | 230    | vbus | 1.018   | 0.688  | 32.5 | 0.21  |        |       |       |
| 26   | RINALDI  | 230    | vbul | 1.046   |        |      |       | 47.2   | 0.213 | 1     |
| 26   | RINALDI  | 230    | vbul | 1.046   | 0.714  | 31.7 | 0.21  |        |       |       |
| 26   | RINALDI  | 500    | vbus | 1.038   | 0.708  | 31.8 | 0.21  |        |       |       |
| 26   | RIVER    | 230    | vbul | 1.016   |        |      |       | 51.8   | 0.213 | 1.075 |
| 26   | RIVER    | 230    | vbul | 1.016   | 0.668  | 34.2 | 0.21  |        |       |       |
| 26   | SCATERGD | 138    | vbul | 1.044   |        |      |       | 49.5   | 0.213 | 1.038 |
| 26   | SCATERGD | 138    | vbul | 1.044   | 0.685  | 34.4 | 0.21  |        |       |       |

VOLTAGE CRITERIA VIOLATIONS

| AREA | BUS NAME | BUS KV | TYPE | Initial | MaxDip | Prct | @time | Cycles | From  | To    |
|------|----------|--------|------|---------|--------|------|-------|--------|-------|-------|
| 26   | SCATERGD | 230    | vbus | 1.048   | 0.695  | 33.7 | 0.21  |        |       |       |
| 26   | STJOHN   | 230    | vbul | 1.017   |        |      |       | 51.8   | 0.213 | 1.075 |
| 26   | STJOHN   | 230    | vbul | 1.017   | 0.669  | 34.2 | 0.21  |        |       |       |
| 26   | CNTURY   | 138    | vbus | 1.017   | 0.657  | 35.5 | 0.21  |        |       |       |
| 26   | CNTURY1  | 287    | vbus | 1.014   | 0.654  | 35.5 | 0.21  |        |       |       |
| 26   | CNTURY2  | 287    | vbus | 1.014   | 0.654  | 35.5 | 0.21  |        |       |       |
| 26   | CNTURYLD | 230    | vbul | 1.018   |        |      |       | 51.8   | 0.213 | 1.075 |
| 26   | CNTURYLD | 230    | vbul | 1.018   | 0.662  | 34.9 | 0.21  |        |       |       |
| 26   | WLMNTN1  | 138    | vbus | 1.013   | 0.644  | 36.5 | 0.21  |        |       |       |
| 26   | WLMNTN2  | 138    | vbus | 1.013   | 0.644  | 36.5 | 0.21  |        |       |       |
| 26   | WLMNTNLD | 138    | vbul | 1.013   |        |      |       | 54     | 0.213 | 1.113 |
| 26   | WLMNTNLD | 138    | vbul | 1.013   | 0.634  | 37.4 | 0.21  |        |       |       |
| 26   | FAIRFAX  | 138    | vbul | 1.036   |        |      |       | 49.5   | 0.213 | 1.038 |
| 26   | FAIRFAX  | 138    | vbul | 1.036   | 0.675  | 34.9 | 0.21  |        |       |       |
| 26   | TOLUCA   | 138    | vbus | 1.019   | 0.671  | 34.1 | 0.21  |        |       |       |
| 26   | TOLUCA   | 230    | vbul | 1.019   |        |      |       | 49.5   | 0.213 | 1.038 |
| 26   | TOLUCA   | 230    | vbul | 1.019   | 0.674  | 33.8 | 0.21  |        |       |       |
| 26   | TOLUCA   | 500    | vbus | 1.013   | 0.671  | 33.8 | 0.21  |        |       |       |
| 26   | VELASCO  | 230    | vbul | 1.017   |        |      |       | 51.8   | 0.213 | 1.075 |
| 26   | VELASCO  | 230    | vbul | 1.017   | 0.667  | 34.4 | 0.21  |        |       |       |
| 26   | ATWATER  | 230    | vbul | 1.017   |        |      |       | 51.8   | 0.213 | 1.075 |
| 26   | ATWATER  | 230    | vbul | 1.017   | 0.671  | 34   | 0.21  |        |       |       |
| 26   | HOLYWD   | 230    | vbus | 1.019   | 0.671  | 34.1 | 0.21  |        |       |       |
| 26   | HOLYWD1  | 138    | vbus | 1.036   | 0.675  | 34.9 | 0.21  |        |       |       |
| 26   | HOLYWD2  | 138    | vbus | 1.036   | 0.675  | 34.9 | 0.21  |        |       |       |
| 26   | HOLYWDLD | 138    | vbul | 1.018   |        |      |       | 51.8   | 0.213 | 1.075 |
| 26   | HOLYWDLD | 138    | vbul | 1.018   | 0.667  | 34.5 | 0.21  |        |       |       |
| 26   | NRTHRDGE | 230    | vbul | 1.042   |        |      |       | 47.2   | 0.213 | 1     |
| 26   | NRTHRDGE | 230    | vbul | 1.042   | 0.713  | 31.5 | 0.21  |        |       |       |
| 26   | OLYMPCLD | 138    | vbul | 1.046   |        |      |       | 49.5   | 0.213 | 1.038 |
| 26   | OLYMPCLD | 138    | vbul | 1.046   | 0.694  | 33.6 | 0.21  |        |       |       |
| 26   | AIRPORT  | 138    | vbul | 1.041   |        |      |       | 49.5   | 0.213 | 1.038 |
| 26   | AIRPORT  | 138    | vbul | 1.041   | 0.68   | 34.7 | 0.21  |        |       |       |
| 26   | HARBOR   | 138    | vbul | 1.012   |        |      |       | 54     | 0.213 | 1.113 |
| 26   | HARBOR   | 138    | vbul | 1.012   | 0.643  | 36.5 | 0.21  |        |       |       |
| 26   | TARZANA  | 138    | vbus | 1.045   | 0.703  | 32.8 | 0.21  |        |       |       |
| 26   | TARZANA  | 230    | vbul | 1.041   |        |      |       | 47.2   | 0.213 | 1     |
| 26   | TARZANA  | 230    | vbul | 1.041   | 0.708  | 31.9 | 0.21  |        |       |       |
| 26   | SYLMARLA | 230    | vbus | 1.054   | 0.726  | 31.1 | 0.21  |        |       |       |
| 26   | TAP 1    | 138    | vbus | 1.015   | 0.647  | 36.2 | 0.21  |        |       |       |
| 26   | TAP 2    | 138    | vbus | 1.015   | 0.647  | 36.2 | 0.21  |        |       |       |

VOLTAGE CRITERIA VIOLATIONS

| AREA | BUS NAME | BUS KV | TYPE | Initial | MaxDip | Prct | @time | Cycles | From  | To    |
|------|----------|--------|------|---------|--------|------|-------|--------|-------|-------|
| 26   | SYLMAR3  | 230    | vbus | 1.054   | 0.725  | 31.2 | 0.21  |        |       |       |
| 26   | SYLMAR4  | 230    | vbus | 1.054   | 0.725  | 31.2 | 0.21  |        |       |       |
| 26   | VALLEY   | 138    | vbul | 1.021   |        |      |       | 49.5   | 0.213 | 1.038 |
| 26   | VALLEY   | 138    | vbul | 1.021   | 0.681  | 33.4 | 0.21  |        |       |       |
| 26   | VALLEY   | 230    | vbus | 1.024   | 0.684  | 33.2 | 0.21  |        |       |       |
| 26   | VICTORVL | 287    | vbus | 1.027   | 0.703  | 31.5 | 0.25  |        |       |       |
| 26   | RINALDI2 | 500    | vbus | 1.037   | 0.704  | 32.1 | 0.21  |        |       |       |
| 26   | ADELSVC  | 500    | vbug | 1.031   | 0.721  | 30.1 | 0.33  |        |       |       |

HIGHEST VOLTAGE DIP

| AREA | BUS NAME | BUS KV | TYPE | Initial | MaxDip | Prct | @time |
|------|----------|--------|------|---------|--------|------|-------|
| 26   | WLMNTNLD | 138    | vbul | 1.013   | 0.634  | 37.4 | 0.213 |
| 26   | HARB     | 138    | vbus | 1.013   | 0.634  | 37.4 | 0.213 |
| 26   | ADELSVC  | 500    | vbug | 1.031   | 0.721  | 30.1 | 0.325 |

LOWEST FREQUENCY

| AREA | BUS NAME | BUS KV | TYPE | MaxDip | @time |
|------|----------|--------|------|--------|-------|
| 24   | LCIENEGA | 66     | fbul | 59.379 | 0.054 |
| 24   | TAP 84   | 66     | fbus | 59.549 | 0.042 |
| 24   | MOBGEN   | 13.8   | fbug | 59.413 | 0.054 |

10. Lugo-Eldorado 500 kV, fault at Lugo

Frequency criteria violations disappeared after the generator models were corrected. Voltage violation shown is delayed voltage recovery after the fault

VOLTAGE CRITERIA VIOLATIONS

| AREA | BUS NAME | BUS KV | TYPE | Initial | MaxDip | Prct | @time |
|------|----------|--------|------|---------|--------|------|-------|
| 24   | PADUA    | 66     | vbul | 1.042   | 0.776  | 25.5 | 0.21  |
| 24   | LCIENEGA | 66     | vbul | 1.027   | 0.768  | 25.2 | 0.21  |
| 24   | COTNWD   | 115    | vbul | 1.047   | 0.779  | 25.6 | 0.21  |
| 24   | PERMANTE | 115    | vbul | 1.046   | 0.777  | 25.7 | 0.21  |
| 24   | GOLDHILS | 115    | vbul | 1.046   | 0.777  | 25.7 | 0.21  |
| 26   | GLENDAL  | 230    | vbul | 1.017   | 0.712  | 30   | 0.21  |
| 26   | GRAMERC1 | 138    | vbus | 1.02    | 0.698  | 31.6 | 0.21  |
| 26   | GRAMERC2 | 138    | vbus | 1.02    | 0.698  | 31.6 | 0.21  |
| 26   | HALLDALE | 138    | vbul | 1.015   | 0.689  | 32.1 | 0.21  |
| 26   | HARB     | 138    | vbus | 1.013   | 0.676  | 33.3 | 0.21  |
| 26   | RINALDI  | 230    | vbul | 1.046   | 0.754  | 27.9 | 0.21  |

VOLTAGE CRITERIA VIOLATIONS

| AREA | BUS NAME | BUS KV | TYPE | Initial | MaxDip | Prct | @time |
|------|----------|--------|------|---------|--------|------|-------|
| 26   | RIVER    | 230    | vbul | 1.016   | 0.708  | 30.3 | 0.21  |
| 26   | SCATERGD | 138    | vbul | 1.044   | 0.725  | 30.5 | 0.21  |
| 26   | STJOHN   | 230    | vbul | 1.017   | 0.709  | 30.2 | 0.21  |
| 26   | CNTURY   | 138    | vbus | 1.017   | 0.699  | 31.3 | 0.21  |
| 26   | CNTURY1  | 287    | vbus | 1.014   | 0.697  | 31.2 | 0.21  |
| 26   | CNTURY2  | 287    | vbus | 1.014   | 0.697  | 31.2 | 0.21  |
| 26   | CNTURYLD | 230    | vbul | 1.018   | 0.703  | 30.9 | 0.21  |
| 26   | WLMNTN1  | 138    | vbus | 1.013   | 0.686  | 32.3 | 0.21  |
| 26   | WLMNTN2  | 138    | vbus | 1.013   | 0.686  | 32.3 | 0.21  |
| 26   | WLMNTNLD | 138    | vbul | 1.013   | 0.676  | 33.3 | 0.21  |
| 26   | FAIRFAX  | 138    | vbul | 1.036   | 0.715  | 31   | 0.21  |
| 26   | TOLUCA   | 138    | vbus | 1.019   | 0.712  | 30.1 | 0.21  |
| 26   | TOLUCA   | 230    | vbul | 1.019   | 0.715  | 29.8 | 0.21  |
| 26   | VELASCO  | 230    | vbul | 1.017   | 0.708  | 30.4 | 0.21  |
| 26   | ATWATER  | 230    | vbul | 1.017   | 0.711  | 30.1 | 0.21  |
| 26   | HOLYWD   | 230    | vbus | 1.019   | 0.712  | 30.1 | 0.21  |
| 26   | HOLYWD1  | 138    | vbus | 1.036   | 0.715  | 31   | 0.21  |
| 26   | HOLYWD2  | 138    | vbus | 1.036   | 0.715  | 31   | 0.21  |
| 26   | HOLYWDL  | 138    | vbul | 1.018   | 0.708  | 30.5 | 0.21  |
| 26   | NRTHRDGE | 230    | vbul | 1.042   | 0.752  | 27.9 | 0.21  |
| 26   | OLYMPCLD | 138    | vbul | 1.046   | 0.734  | 29.8 | 0.21  |
| 26   | AIRPORT  | 138    | vbul | 1.041   | 0.721  | 30.8 | 0.21  |
| 26   | HARBOR   | 138    | vbul | 1.012   | 0.685  | 32.3 | 0.21  |
| 26   | TARZANA  | 230    | vbul | 1.041   | 0.747  | 28.2 | 0.21  |
| 26   | TAP 1    | 138    | vbus | 1.015   | 0.69   | 32.1 | 0.21  |
| 26   | TAP 2    | 138    | vbus | 1.015   | 0.69   | 32.1 | 0.21  |
| 26   | VALLEY   | 138    | vbul | 1.021   | 0.721  | 29.5 | 0.21  |

HIGHEST VOLTAGE DIP

| AREA | BUS NAME | BUS KV | TYPE | Initial | MaxDip | Prct | @time |
|------|----------|--------|------|---------|--------|------|-------|
| 26   | WLMNTNLD | 138    | vbul | 1.013   | 0.676  | 33.3 | 0.213 |
| 26   | HARB     | 138    | vbus | 1.013   | 0.676  | 33.3 | 0.213 |
| 26   | ADELSVC  | 500    | vbug | 1.031   | 0.769  | 25.4 | 0.213 |

LOWEST FREQUENCY

| AREA | BUS NAME | BUS KV | TYPE | MaxDip | @time |
|------|----------|--------|------|--------|-------|
| 24   | LCIENEGA | 66     | fbul | 59.379 | 0.054 |
| 24   | TAP 84   | 66     | fbus | 59.549 | 0.042 |
| 24   | MOBGEN   | 13.8   | fbug | 59.413 | 0.054 |

## 11. Lugo-Mohave 500 kV, fault at Lugo

Frequency criteria violations disappeared after the generator models were corrected. Voltage violation shown is delayed voltage recovery after the fault

### VOLTAGE CRITERIA VIOLATIONS

| AREA | BUS NAME | BUS KV | TYPE | Initial | MaxDip | Prct | @time |
|------|----------|--------|------|---------|--------|------|-------|
| 26   | GLENDAL  | 230    | vbul | 1.017   | 0.741  | 27.2 | 0.21  |
| 26   | HALLDALE | 138    | vbul | 1.015   | 0.719  | 29.1 | 0.21  |
| 26   | HARB     | 138    | vbus | 1.013   | 0.707  | 30.2 | 0.21  |
| 26   | RINALDI  | 230    | vbul | 1.046   | 0.782  | 25.2 | 0.21  |
| 26   | RIVER    | 230    | vbul | 1.016   | 0.737  | 27.5 | 0.21  |
| 26   | SCATERGD | 138    | vbul | 1.044   | 0.754  | 27.7 | 0.21  |
| 26   | STJOHN   | 230    | vbul | 1.017   | 0.738  | 27.4 | 0.21  |
| 26   | CNTURYLD | 230    | vbul | 1.018   | 0.733  | 28   | 0.21  |
| 26   | WLMNTNLD | 138    | vbul | 1.013   | 0.707  | 30.2 | 0.21  |
| 26   | FAIRFAX  | 138    | vbul | 1.036   | 0.744  | 28.2 | 0.21  |
| 26   | TOLUCA   | 230    | vbul | 1.019   | 0.744  | 27   | 0.21  |
| 26   | VELASCO  | 230    | vbul | 1.017   | 0.736  | 27.6 | 0.21  |
| 26   | ATWATER  | 230    | vbul | 1.017   | 0.74   | 27.3 | 0.21  |
| 26   | HOLYWDL  | 138    | vbul | 1.018   | 0.737  | 27.6 | 0.21  |
| 26   | NRTHRDGE | 230    | vbul | 1.042   | 0.779  | 25.2 | 0.21  |
| 26   | OLYMPCLD | 138    | vbul | 1.046   | 0.762  | 27.1 | 0.21  |
| 26   | AIRPORT  | 138    | vbul | 1.041   | 0.75   | 28   | 0.21  |
| 26   | HARBOR   | 138    | vbul | 1.012   | 0.715  | 29.4 | 0.21  |
| 26   | TARZANA  | 230    | vbul | 1.041   | 0.774  | 25.6 | 0.21  |
| 26   | VALLEY   | 138    | vbul | 1.021   | 0.749  | 26.7 | 0.21  |

### HIGHEST VOLTAGE DIP

| AREA | BUS NAME | BUS KV | TYPE | Initial | MaxDip | Prct | @time |
|------|----------|--------|------|---------|--------|------|-------|
| 26   | WLMNTNLD | 138    | vbul | 1.013   | 0.707  | 30.2 | 0.213 |
| 26   | HARB     | 138    | vbus | 1.013   | 0.707  | 30.2 | 0.213 |
| 24   | BOREL    | 66     | vbug | 0.999   | 0.766  | 23.3 | 0.213 |

### LOWEST FREQUENCY

| AREA | BUS NAME | BUS KV | TYPE | MaxDip | @time |
|------|----------|--------|------|--------|-------|
| 24   | LCIENEGA | 66     | fbul | 59.378 | 0.05  |
| 24   | TAP 84   | 66     | fbus | 59.54  | 0.05  |
| 24   | MOBGEN   | 13.8   | fbug | 59.412 | 0.05  |

## 12. Lugo-Miraloma 500 kV # 2, fault on Lugo

Frequency criteria violations disappeared after the generator models were corrected. Voltage violation shown is delayed voltage recovery after the fault

#### VOLTAGE CRITERIA VIOLATIONS

| AREA | BUS NAME | BUS KV | TYPE | Initial | MaxDip | Prct | @time |
|------|----------|--------|------|---------|--------|------|-------|
| 26   | GLENDAL  | 230    | vbul | 1.017   | 0.731  | 28.1 | 0.21  |
| 26   | HALLDALE | 138    | vbul | 1.015   | 0.709  | 30.1 | 0.21  |
| 26   | HARB     | 138    | vbus | 1.013   | 0.696  | 31.3 | 0.21  |
| 26   | RINALDI  | 230    | vbul | 1.046   | 0.772  | 26.2 | 0.21  |
| 26   | RIVER    | 230    | vbul | 1.016   | 0.727  | 28.5 | 0.21  |
| 26   | SCATERGD | 138    | vbul | 1.044   | 0.744  | 28.7 | 0.21  |
| 26   | STJOHN   | 230    | vbul | 1.017   | 0.728  | 28.4 | 0.21  |
| 26   | CNTURYLD | 230    | vbul | 1.018   | 0.723  | 29   | 0.21  |
| 26   | WLMNTN1  | 138    | vbus | 1.013   | 0.706  | 30.3 | 0.21  |
| 26   | WLMNTN2  | 138    | vbus | 1.013   | 0.706  | 30.3 | 0.21  |
| 26   | WLMNTNLD | 138    | vbul | 1.013   | 0.696  | 31.3 | 0.21  |
| 26   | FAIRFAX  | 138    | vbul | 1.036   | 0.734  | 29.2 | 0.21  |
| 26   | TOLUCA   | 230    | vbul | 1.019   | 0.734  | 27.9 | 0.21  |
| 26   | VELASCO  | 230    | vbul | 1.017   | 0.727  | 28.6 | 0.21  |
| 26   | ATWATER  | 230    | vbul | 1.017   | 0.73   | 28.2 | 0.21  |
| 26   | HOLYWDL  | 138    | vbul | 1.018   | 0.727  | 28.6 | 0.21  |
| 26   | NRTHRDGE | 230    | vbul | 1.042   | 0.769  | 26.2 | 0.21  |
| 26   | OLYMPCLD | 138    | vbul | 1.046   | 0.752  | 28.1 | 0.21  |
| 26   | AIRPORT  | 138    | vbul | 1.041   | 0.739  | 29   | 0.21  |
| 26   | HARBOR   | 138    | vbul | 1.012   | 0.705  | 30.4 | 0.21  |
| 26   | TARZANA  | 230    | vbul | 1.041   | 0.764  | 26.5 | 0.21  |
| 26   | TAP 1    | 138    | vbus | 1.015   | 0.709  | 30.1 | 0.21  |
| 26   | TAP 2    | 138    | vbus | 1.015   | 0.709  | 30.1 | 0.21  |
| 26   | VALLEY   | 138    | vbul | 1.021   | 0.739  | 27.6 | 0.21  |

#### HIGHEST VOLTAGE DIP

| AREA | BUS NAME | BUS KV | TYPE | Initial | MaxDip | Prct | @time |
|------|----------|--------|------|---------|--------|------|-------|
| 26   | WLMNTNLD | 138    | vbul | 1.013   | 0.696  | 31.3 | 0.213 |
| 26   | HARB     | 138    | vbus | 1.013   | 0.696  | 31.3 | 0.213 |
| 24   | BOREL    | 66     | vbug | 0.999   | 0.761  | 23.8 | 0.213 |

#### LOWEST FREQUENCY

| AREA | BUS NAME | BUS KV | TYPE | MaxDip | @time |
|------|----------|--------|------|--------|-------|
| 24   | LCIENEGA | 66     | fbul | 59.379 | 0.054 |
| 24   | TAP 84   | 66     | fbus | 59.549 | 0.042 |
| 24   | MOBGEN   | 13.8   | fbug | 59.413 | 0.054 |

13. Lugo-Miraloma 500 kV # 3, fault on Lugo

Frequency criteria violations disappeared after the generator models were corrected. Voltage violation shown is delayed voltage recovery after the fault

#### VOLTAGE CRITERIA VIOLATIONS

| AREA | BUS NAME | BUS KV | TYPE |  | Initial | MaxDip | Prct | @time |
|------|----------|--------|------|--|---------|--------|------|-------|
| 26   | GLENDAL  | 230    | vbul |  | 1.017   | 0.731  | 28.1 | 0.21  |
| 26   | HALLDALE | 138    | vbul |  | 1.015   | 0.709  | 30.1 | 0.21  |
| 26   | HARB     | 138    | vbus |  | 1.013   | 0.696  | 31.3 | 0.21  |
| 26   | RINALDI  | 230    | vbul |  | 1.046   | 0.772  | 26.2 | 0.21  |
| 26   | RIVER    | 230    | vbul |  | 1.016   | 0.727  | 28.5 | 0.21  |
| 26   | SCATERGD | 138    | vbul |  | 1.044   | 0.744  | 28.7 | 0.21  |
| 26   | STJOHN   | 230    | vbul |  | 1.017   | 0.728  | 28.4 | 0.21  |
| 26   | CNTURYLD | 230    | vbul |  | 1.018   | 0.723  | 29   | 0.21  |
| 26   | WLMNTN1  | 138    | vbus |  | 1.013   | 0.706  | 30.3 | 0.21  |
| 26   | WLMNTN2  | 138    | vbus |  | 1.013   | 0.706  | 30.3 | 0.21  |
| 26   | WLMNTNLD | 138    | vbul |  | 1.013   | 0.696  | 31.3 | 0.21  |
| 26   | FAIRFAX  | 138    | vbul |  | 1.036   | 0.734  | 29.2 | 0.21  |
| 26   | TOLUCA   | 230    | vbul |  | 1.019   | 0.734  | 27.9 | 0.21  |
| 26   | VELASCO  | 230    | vbul |  | 1.017   | 0.727  | 28.6 | 0.21  |
| 26   | ATWATER  | 230    | vbul |  | 1.017   | 0.73   | 28.2 | 0.21  |
| 26   | HOLYWDLD | 138    | vbul |  | 1.018   | 0.727  | 28.6 | 0.21  |
| 26   | NRTHRDGE | 230    | vbul |  | 1.042   | 0.769  | 26.2 | 0.21  |
| 26   | OLYMPCLD | 138    | vbul |  | 1.046   | 0.752  | 28.1 | 0.21  |
| 26   | AIRPORT  | 138    | vbul |  | 1.041   | 0.739  | 29   | 0.21  |
| 26   | HARBOR   | 138    | vbul |  | 1.012   | 0.705  | 30.4 | 0.21  |
| 26   | TARZANA  | 230    | vbul |  | 1.041   | 0.764  | 26.5 | 0.21  |
| 26   | TAP 1    | 138    | vbus |  | 1.015   | 0.71   | 30.1 | 0.21  |
| 26   | TAP 2    | 138    | vbus |  | 1.015   | 0.71   | 30.1 | 0.21  |
| 26   | VALLEY   | 138    | vbul |  | 1.021   | 0.739  | 27.6 | 0.21  |

#### HIGHEST VOLTAGE DIP

| AREA | BUS NAME | BUS KV | TYPE | Initial | MaxDip | Prct | @time |
|------|----------|--------|------|---------|--------|------|-------|
| 26   | WLMNTNLD | 138    | vbul | 1.013   | 0.696  | 31.3 | 0.213 |
| 26   | HARB     | 138    | vbus | 1.013   | 0.696  | 31.3 | 0.213 |
| 24   | BOREL    | 66     | vbug | 0.999   | 0.761  | 23.8 | 0.213 |

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LOWEST FREQUENCY

| AREA | BUS NAME | BUS KV | TYPE | MaxDip | @time |
|------|----------|--------|------|--------|-------|
| 24   | LCIENEGA | 66     | fbul | 59.379 | 0.054 |
| 24   | TAP 84   | 66     | fbus | 59.549 | 0.042 |
| 24   | MOBGEN   | 13.8   | fbug | 59.413 | 0.054 |

14. Lugo-Miraloma 500 kV # 1 and 2 double outage, fault on Lugo

No violations. Voltage violations shown in the table is delayed voltage recovery.

VOLTAGE CRITERIA VIOLATIONS

| AREA | BUS NAME | BUS KV | TYPE |  | Initial | MaxDip | Prct | @time |
|------|----------|--------|------|--|---------|--------|------|-------|
| 26   | GLENDALE | 230    | vbul |  | 1.017   | 0.704  | 30.8 | 0.21  |
| 26   | GRAMERC1 | 138    | vbus |  | 1.02    | 0.691  | 32.2 | 0.21  |
| 26   | GRAMERC2 | 138    | vbus |  | 1.02    | 0.691  | 32.2 | 0.21  |
| 26   | HALLDALE | 138    | vbul |  | 1.015   | 0.682  | 32.8 | 0.21  |
| 26   | HARB     | 138    | vbus |  | 1.013   | 0.67   | 33.9 | 0.21  |
| 26   | RIVER    | 230    | vbul |  | 1.016   | 0.701  | 31   | 0.21  |
| 26   | SCATERGD | 138    | vbul |  | 1.044   | 0.717  | 31.3 | 0.21  |
| 26   | SCATERGD | 230    | vbus |  | 1.048   | 0.726  | 30.7 | 0.21  |
| 26   | STJOHN   | 230    | vbul |  | 1.017   | 0.702  | 30.9 | 0.21  |
| 26   | CNTURY   | 138    | vbus |  | 1.017   | 0.692  | 32   | 0.21  |
| 26   | CNTURY1  | 287    | vbus |  | 1.014   | 0.691  | 31.9 | 0.21  |
| 26   | CNTURY2  | 287    | vbus |  | 1.014   | 0.691  | 31.9 | 0.21  |
| 26   | CNTURYLD | 230    | vbul |  | 1.018   | 0.696  | 31.6 | 0.21  |
| 26   | WLMNTN1  | 138    | vbus |  | 1.013   | 0.679  | 33   | 0.21  |
| 26   | WLMNTN2  | 138    | vbus |  | 1.013   | 0.679  | 33   | 0.21  |
| 26   | WLMNTNLD | 138    | vbul |  | 1.013   | 0.67   | 33.9 | 0.21  |
| 26   | FAIRFAX  | 138    | vbul |  | 1.036   | 0.707  | 31.8 | 0.21  |
| 26   | TOLUCA   | 138    | vbus |  | 1.019   | 0.704  | 30.9 | 0.21  |
| 26   | TOLUCA   | 230    | vbul |  | 1.019   | 0.707  | 30.6 | 0.21  |
| 26   | TOLUCA   | 500    | vbus |  | 1.013   | 0.707  | 30.2 | 0.21  |
| 26   | VELASCO  | 230    | vbul |  | 1.017   | 0.7    | 31.1 | 0.21  |
| 26   | ATWATER  | 230    | vbul |  | 1.017   | 0.703  | 30.8 | 0.21  |
| 26   | HOLYWD   | 230    | vbus |  | 1.019   | 0.704  | 30.9 | 0.21  |
| 26   | HOLYWD1  | 138    | vbus |  | 1.036   | 0.707  | 31.8 | 0.21  |
| 26   | HOLYWD2  | 138    | vbus |  | 1.036   | 0.707  | 31.8 | 0.21  |
| 26   | HOLYWDL  | 138    | vbul |  | 1.018   | 0.7    | 31.3 | 0.21  |
| 26   | OLYMP    | 230    | vbus |  | 1.047   | 0.728  | 30.5 | 0.21  |
| 26   | OLYMPCLD | 138    | vbul |  | 1.046   | 0.725  | 30.7 | 0.21  |
| 26   | AIRPORT  | 138    | vbul |  | 1.041   | 0.712  | 31.6 | 0.21  |
| 26   | HARBOR   | 138    | vbul |  | 1.012   | 0.678  | 33   | 0.21  |

VOLTAGE CRITERIA VIOLATIONS

| AREA | BUS NAME | BUS KV | TYPE | Initial | MaxDip | Prct | @time |
|------|----------|--------|------|---------|--------|------|-------|
| 26   | TAP 1    | 138    | vbus | 1.015   | 0.683  | 32.7 | 0.21  |
| 26   | TAP 2    | 138    | vbus | 1.015   | 0.683  | 32.7 | 0.21  |
| 26   | VALLEY   | 138    | vbul | 1.021   | 0.712  | 30.3 | 0.21  |
| 26   | VALLEY   | 230    | vbus | 1.024   | 0.716  | 30.1 | 0.21  |

HIGHEST VOLTAGE DIP

| AREA | BUS NAME | BUS KV | TYPE | Initial | MaxDip | Prct | @time |
|------|----------|--------|------|---------|--------|------|-------|
| 26   | WLMNTNLD | 138    | vbul | 1.013   | 0.67   | 33.9 | 0.213 |
| 26   | HARB     | 138    | vbus | 1.013   | 0.67   | 33.9 | 0.213 |
| 24   | BOREL    | 66     | vbug | 0.999   | 0.73   | 26.9 | 0.213 |

LOWEST FREQUENCY

| AREA | BUS NAME | BUS KV | TYPE | MaxDip | @time |
|------|----------|--------|------|--------|-------|
| 24   | LCIENEGA | 66     | fbul | 59.379 | 0.054 |
| 24   | TAP 84   | 66     | fbus | 59.549 | 0.042 |
| 24   | MOBGEN   | 13.8   | fbug | 59.413 | 0.054 |

15. Lugo-Victorville 500 kV, fault at Victorville

No violations. Voltage violations shown in the table is delayed voltage recovery.

VOLTAGE CRITERIA VIOLATIONS

| AREA | BUS NAME | BUS KV | TYPE | Initial | MaxDip | Prct | @time |
|------|----------|--------|------|---------|--------|------|-------|
| 26   | ADELANTO | 500    | vbus | 1.031   | 0.7    | 32.1 | 0.21  |
| 26   | GLENDALE | 230    | vbul | 1.017   | 0.643  | 36.8 | 0.21  |
| 26   | GRAMERC1 | 138    | vbus | 1.02    | 0.622  | 39   | 0.21  |
| 26   | GRAMERC2 | 138    | vbus | 1.02    | 0.622  | 39   | 0.21  |
| 26   | HALLDALE | 138    | vbul | 1.015   | 0.612  | 39.7 | 0.21  |
| 26   | HARB     | 138    | vbus | 1.013   | 0.596  | 41.2 | 0.21  |
| 26   | HAYNES   | 230    | vbus | 1.018   | 0.659  | 35.3 | 0.21  |
| 26   | OLIVE    | 230    | vbus | 1.039   | 0.717  | 31   | 0.21  |
| 26   | RINALDI  | 230    | vbul | 1.046   | 0.693  | 33.8 | 0.21  |
| 26   | RINALDI  | 500    | vbus | 1.038   | 0.68   | 34.5 | 0.21  |
| 26   | RIVER    | 230    | vbul | 1.016   | 0.637  | 37.3 | 0.21  |
| 26   | SCATERGD | 138    | vbul | 1.044   | 0.656  | 37.2 | 0.21  |
| 26   | SCATERGD | 230    | vbus | 1.048   | 0.668  | 36.3 | 0.21  |
| 26   | STJOHN   | 230    | vbul | 1.017   | 0.639  | 37.1 | 0.21  |
| 26   | CNTURY   | 138    | vbus | 1.017   | 0.623  | 38.8 | 0.21  |
| 26   | CNTURY1  | 287    | vbus | 1.014   | 0.621  | 38.8 | 0.21  |
| 26   | CNTURY2  | 287    | vbus | 1.014   | 0.621  | 38.8 | 0.21  |
| 26   | CNTURYLD | 230    | vbul | 1.018   | 0.63   | 38.1 | 0.21  |

VOLTAGE CRITERIA VIOLATIONS

| AREA | BUS NAME | BUS KV | TYPE |  | Initial | MaxDip | Prct | @time |
|------|----------|--------|------|--|---------|--------|------|-------|
| 26   | WLMNTN1  | 138    | vbus |  | 1.013   | 0.608  | 40   | 0.21  |
| 26   | WLMNTN2  | 138    | vbus |  | 1.013   | 0.608  | 40   | 0.21  |
| 26   | WLMNTNLD | 138    | vbul |  | 1.013   | 0.596  | 41.2 | 0.21  |
| 26   | FAIRFAX  | 138    | vbul |  | 1.036   | 0.644  | 37.9 | 0.21  |
| 26   | TOLUCA   | 138    | vbus |  | 1.019   | 0.643  | 36.9 | 0.21  |
| 26   | TOLUCA   | 230    | vbul |  | 1.019   | 0.647  | 36.5 | 0.21  |
| 26   | TOLUCA   | 500    | vbus |  | 1.013   | 0.64   | 36.8 | 0.21  |
| 26   | VELASCO  | 230    | vbul |  | 1.017   | 0.636  | 37.4 | 0.21  |
| 26   | ATWATER  | 230    | vbul |  | 1.017   | 0.642  | 36.9 | 0.21  |
| 26   | HOLYWD   | 230    | vbus |  | 1.019   | 0.643  | 36.9 | 0.21  |
| 26   | HOLYWD1  | 138    | vbus |  | 1.036   | 0.644  | 37.8 | 0.21  |
| 26   | HOLYWD2  | 138    | vbus |  | 1.036   | 0.644  | 37.8 | 0.21  |
| 26   | HOLYWDLD | 138    | vbul |  | 1.018   | 0.638  | 37.3 | 0.21  |
| 26   | NRTHRDGE | 230    | vbul |  | 1.042   | 0.692  | 33.6 | 0.21  |
| 26   | OLYMPC   | 230    | vbus |  | 1.047   | 0.671  | 35.9 | 0.21  |
| 26   | OLYMPCLD | 138    | vbul |  | 1.046   | 0.668  | 36.2 | 0.21  |
| 26   | AIRPORT  | 138    | vbul |  | 1.041   | 0.65   | 37.6 | 0.21  |
| 26   | HARBOR   | 138    | vbul |  | 1.012   | 0.607  | 40   | 0.21  |
| 26   | TARZANA  | 138    | vbus |  | 1.045   | 0.678  | 35.1 | 0.21  |
| 26   | TARZANA  | 230    | vbul |  | 1.041   | 0.686  | 34.1 | 0.21  |
| 26   | SYLMARLA | 230    | vbus |  | 1.054   | 0.709  | 32.7 | 0.21  |
| 26   | TAP 1    | 138    | vbus |  | 1.015   | 0.612  | 39.7 | 0.21  |
| 26   | TAP 2    | 138    | vbus |  | 1.015   | 0.612  | 39.7 | 0.21  |
| 26   | SYLMAR1  | 230    | vbus |  | 1.061   | 0.788  | 25.8 | 0.21  |
| 26   | SYLMAR3  | 230    | vbus |  | 1.054   | 0.708  | 32.8 | 0.21  |
| 26   | SYLMAR4  | 230    | vbus |  | 1.054   | 0.708  | 32.8 | 0.21  |
| 26   | VALLEY   | 138    | vbul |  | 1.021   | 0.656  | 35.8 | 0.21  |
| 26   | VALLEY   | 230    | vbus |  | 1.024   | 0.661  | 35.5 | 0.21  |
| 26   | VICTORVL | 287    | vbus |  | 1.027   | 0.684  | 33.4 | 0.21  |
| 26   | VICTORVL | 500    | vbus |  | 1.033   | 0.709  | 31.4 | 0.21  |
| 26   | RINALDI2 | 500    | vbus |  | 1.037   | 0.677  | 34.7 | 0.21  |
| 26   | ADELSVC  | 500    | vbug |  | 1.031   | 0.7    | 32.1 | 0.21  |

HIGHEST VOLTAGE DIP

| AREA | BUS NAME | BUS KV | TYPE |  | Initial | MaxDip | Prct | @time |
|------|----------|--------|------|--|---------|--------|------|-------|
| 26   | WLMNTNLD | 138    | vbul |  | 1.013   | 0.596  | 41.2 | 0.213 |
| 26   | HARB     | 138    | vbus |  | 1.013   | 0.596  | 41.2 | 0.213 |
| 26   | ADELSVC  | 500    | vbug |  | 1.031   | 0.7    | 32.1 | 0.213 |

LOWEST FREQUENCY

| AREA | BUS NAME | BUS KV | TYPE |  | MaxDip | @time |
|------|----------|--------|------|--|--------|-------|
|------|----------|--------|------|--|--------|-------|

|    |          |      |      |  |        |       |
|----|----------|------|------|--|--------|-------|
| 26 | WLMNTNLD | 138  | fbul |  | 59.381 | 0.067 |
| 26 | HARB     | 138  | fbus |  | 59.381 | 0.067 |
| 26 | HARB1G   | 13.8 | fbug |  | 59.381 | 0.067 |

16. Lugo-Vincent # 1 and 2 500 kV double outage, fault at Lugo

No violations. Voltage violations shown in the table is delayed voltage recovery.

VOLTAGE CRITERIA VIOLATIONS

| AREA | BUS NAME | BUS KV | TYPE | Initial | MaxDip | Prct | @time | Cycles | From | To |
|------|----------|--------|------|---------|--------|------|-------|--------|------|----|
| 26   | GLENDAL  | 230    | vbul | 1.017   | 0.67   | 34.2 | 0.21  |        |      |    |
| 26   | GRAMERC1 | 138    | vbus | 1.02    | 0.651  | 36.1 | 0.21  |        |      |    |
| 26   | GRAMERC2 | 138    | vbus | 1.02    | 0.651  | 36.1 | 0.21  |        |      |    |
| 26   | HALLDALE | 138    | vbul | 1.015   | 0.642  | 36.8 | 0.21  |        |      |    |
| 26   | HARB     | 138    | vbus | 1.013   | 0.626  | 38.2 | 0.21  |        |      |    |
| 26   | HAYNES   | 230    | vbus | 1.018   | 0.684  | 32.9 | 0.21  |        |      |    |
| 26   | RINALDI  | 230    | vbul | 1.046   | 0.713  | 31.8 | 0.21  |        |      |    |
| 26   | RINALDI  | 500    | vbus | 1.038   | 0.709  | 31.7 | 0.21  |        |      |    |
| 26   | RIVER    | 230    | vbul | 1.016   | 0.664  | 34.6 | 0.21  |        |      |    |
| 26   | SCATERGD | 138    | vbul | 1.044   | 0.679  | 34.9 | 0.21  |        |      |    |
| 26   | SCATERGD | 230    | vbus | 1.048   | 0.69   | 34.2 | 0.21  |        |      |    |
| 26   | STJOHN   | 230    | vbul | 1.017   | 0.666  | 34.5 | 0.21  |        |      |    |
| 26   | CNTURY   | 138    | vbus | 1.017   | 0.653  | 35.8 | 0.21  |        |      |    |
| 26   | CNTURY1  | 287    | vbus | 1.014   | 0.652  | 35.6 | 0.21  |        |      |    |
| 26   | CNTURY2  | 287    | vbus | 1.014   | 0.652  | 35.6 | 0.21  |        |      |    |
| 26   | CNTURYLD | 230    | vbul | 1.018   | 0.659  | 35.3 | 0.21  |        |      |    |
| 26   | WLMNTN1  | 138    | vbus | 1.013   | 0.638  | 37   | 0.21  |        |      |    |
| 26   | WLMNTN2  | 138    | vbus | 1.013   | 0.638  | 37   | 0.21  |        |      |    |
| 26   | WLMNTNLD | 138    | vbul | 1.013   | 0.626  | 38.2 | 0.21  |        |      |    |
| 26   | FAIRFAX  | 138    | vbul | 1.036   | 0.668  | 35.5 | 0.21  |        |      |    |
| 26   | TOLUCA   | 138    | vbus | 1.019   | 0.669  | 34.3 | 0.21  |        |      |    |
| 26   | TOLUCA   | 230    | vbul | 1.019   | 0.673  | 33.9 | 0.21  |        |      |    |
| 26   | TOLUCA   | 500    | vbus | 1.013   | 0.675  | 33.4 | 0.21  |        |      |    |
| 26   | VELASCO  | 230    | vbul | 1.017   | 0.664  | 34.8 | 0.21  |        |      |    |
| 26   | ATWATER  | 230    | vbul | 1.017   | 0.668  | 34.3 | 0.21  |        |      |    |
| 26   | HOLYWD   | 230    | vbus | 1.019   | 0.669  | 34.3 | 0.21  |        |      |    |
| 26   | HOLYWD1  | 138    | vbus | 1.036   | 0.669  | 35.5 | 0.21  |        |      |    |
| 26   | HOLYWD2  | 138    | vbus | 1.036   | 0.669  | 35.5 | 0.21  |        |      |    |
| 26   | HOLYWDL  | 138    | vbul | 1.018   | 0.664  | 34.8 | 0.21  |        |      |    |
| 26   | NRTHRDGE | 230    | vbul | 1.042   | 0.711  | 31.8 | 0.21  |        |      |    |
| 26   | OLYMP    | 230    | vbus | 1.047   | 0.693  | 33.8 | 0.21  |        |      |    |
| 26   | OLYMPCLD | 138    | vbul | 1.046   | 0.689  | 34.1 | 0.21  |        |      |    |
| 26   | AIRPORT  | 138    | vbul | 1.041   | 0.674  | 35.3 | 0.21  |        |      |    |
| 26   | HARBOR   | 138    | vbul | 1.012   | 0.637  | 37.1 | 0.21  |        |      |    |
| 26   | TARZANA  | 138    | vbus | 1.045   | 0.698  | 33.2 | 0.21  |        |      |    |
| 26   | TARZANA  | 230    | vbul | 1.041   | 0.705  | 32.2 | 0.21  |        |      |    |

VOLTAGE CRITERIA VIOLATIONS

| AREA | BUS NAME | BUS KV | TYPE | Initial | MaxDip | Prct | @time | Cycles | From | To |
|------|----------|--------|------|---------|--------|------|-------|--------|------|----|
| 26   | SYLMARLA | 230    | vbus | 1.054   | 0.724  | 31.3 | 0.21  |        |      |    |
| 26   | TAP 1    | 138    | vbus | 1.015   | 0.642  | 36.7 | 0.21  |        |      |    |
| 26   | TAP 2    | 138    | vbus | 1.015   | 0.642  | 36.7 | 0.21  |        |      |    |
| 26   | SYLMAR3  | 230    | vbus | 1.054   | 0.724  | 31.3 | 0.21  |        |      |    |
| 26   | SYLMAR4  | 230    | vbus | 1.054   | 0.724  | 31.3 | 0.21  |        |      |    |
| 26   | VALLEY   | 138    | vbul | 1.021   | 0.68   | 33.5 | 0.21  |        |      |    |
| 26   | VALLEY   | 230    | vbus | 1.024   | 0.684  | 33.2 | 0.21  |        |      |    |
| 26   | RINALDI2 | 500    | vbus | 1.037   | 0.707  | 31.8 | 0.21  |        |      |    |

HIGHEST VOLTAGE DIP

| AREA | BUS NAME | BUS KV | TYPE | Initial | MaxDip | Prct | @time    |
|------|----------|--------|------|---------|--------|------|----------|
| 26   | WLMNTNLD | 138    | vbul | 1.013   | 0.626  | 38.2 | 0.213 26 |
| 26   | HARB     | 138    | vbus | 1.013   | 0.626  | 38.2 | 0.213 26 |
| 26   | ADELSVC  | 500    | vbug | 1.031   | 0.755  | 26.7 | 0.213 26 |

LOWEST FREQUENCY

| AREA | BUS NAME | BUS KV | TYPE | MaxDip | @time    |
|------|----------|--------|------|--------|----------|
| 26   | WLMNTNLD | 138    | fbul | 59.264 | 0.042 26 |
| 26   | HARB     | 138    | fbus | 59.264 | 0.042 26 |
| 26   | HARB1G   | 13.8   | fbug | 59.264 | 0.042 26 |

17. Adelanto-Victorville 500 kV, fault on Adelanto

No violations

HIGHEST VOLTAGE DIP

| AREA | BUS NAME | BUS KV | TYPE | Initial | MaxDip | Prct | @time |
|------|----------|--------|------|---------|--------|------|-------|
| 26   | WLMNTNLD | 138    | vbul | 1.013   | 0.805  | 20.5 | 0.221 |
| 26   | HARB     | 138    | vbus | 1.013   | 0.805  | 20.5 | 0.221 |
| 26   | ADELSVC  | 500    | vbug | 1.031   | 0.886  | 14.1 | 0.221 |

LOWEST FREQUENCY

| AREA | BUS NAME | BUS KV | TYPE | MaxDip | @time |
|------|----------|--------|------|--------|-------|
| 26   | WLMNTNLD | 138    | fbul | 59.452 | 0.067 |
| 26   | HARB     | 138    | fbus | 59.452 | 0.067 |
| 26   | HARB1G   | 13.8   | fbug | 59.452 | 0.067 |

18. Adelanto-Toluca 500 kV, fault on Adelanto

No violations. Voltage violations shown in the table is delayed voltage recovery.

VOLTAGE CRITERIA VIOLATIONS

| AREA | BUS NAME | BUS KV | TYPE |  | Initial | MaxDip | Prct | @time |
|------|----------|--------|------|--|---------|--------|------|-------|
| 26   | GLENDAL  | 230    | vbul |  | 1.017   | 0.744  | 26.8 | 0.22  |
| 26   | HALLDALE | 138    | vbul |  | 1.015   | 0.722  | 28.8 | 0.22  |
| 26   | HARB     | 138    | vbus |  | 1.013   | 0.708  | 30.1 | 0.22  |
| 26   | RIVER    | 230    | vbul |  | 1.016   | 0.74   | 27.2 | 0.22  |
| 26   | SCATERGD | 138    | vbul |  | 1.044   | 0.773  | 25.9 | 0.22  |
| 26   | STJOHN   | 230    | vbul |  | 1.017   | 0.741  | 27.1 | 0.22  |
| 26   | CNTURYLD | 230    | vbul |  | 1.018   | 0.736  | 27.7 | 0.22  |
| 26   | WLMNTNLD | 138    | vbul |  | 1.013   | 0.708  | 30.1 | 0.22  |
| 26   | FAIRFAX  | 138    | vbul |  | 1.036   | 0.76   | 26.7 | 0.22  |
| 26   | TOLUCA   | 230    | vbul |  | 1.019   | 0.747  | 26.6 | 0.22  |
| 26   | VELASCO  | 230    | vbul |  | 1.017   | 0.74   | 27.3 | 0.22  |
| 26   | ATWATER  | 230    | vbul |  | 1.017   | 0.743  | 26.9 | 0.22  |
| 26   | HOLYWDLD | 138    | vbul |  | 1.018   | 0.743  | 27.1 | 0.22  |
| 26   | AIRPORT  | 138    | vbul |  | 1.041   | 0.767  | 26.3 | 0.22  |
| 26   | HARBOR   | 138    | vbul |  | 1.012   | 0.718  | 29.1 | 0.22  |
| 26   | VALLEY   | 138    | vbul |  | 1.021   | 0.756  | 26   | 0.22  |

HIGHEST VOLTAGE DIP

| AREA | BUS NAME | BUS KV | TYPE |  | Initial | MaxDip | Prct | @time |
|------|----------|--------|------|--|---------|--------|------|-------|
| 26   | WLMNTNLD | 138    | vbul |  | 1.013   | 0.708  | 30.1 | 0.221 |
| 26   | HARB     | 138    | vbus |  | 1.013   | 0.708  | 30.1 | 0.221 |
| 26   | ADELSVC  | 500    | vbug |  | 1.031   | 0.865  | 16.1 | 0.221 |

LOWEST FREQUENCY

| AREA | BUS NAME | BUS KV | TYPE |  | MaxDip | @time |
|------|----------|--------|------|--|--------|-------|
| 26   | WLMNTNLD | 138    | fbul |  | 59.452 | 0.067 |
| 26   | HARB     | 138    | fbus |  | 59.452 | 0.067 |
| 26   | HARB1G   | 13.8   | fbug |  | 59.452 | 0.067 |

19. Adelanto-Rinaldi # 2 500 kV, fault on Adelanto

No violations

HIGHEST VOLTAGE DIP

| AREA | BUS NAME | BUS KV | TYPE |  | Initial | MaxDip | Prct | @time |
|------|----------|--------|------|--|---------|--------|------|-------|
| 26   | WLMNTNLD | 138    | vbul |  | 1.013   | 0.77   | 24   | 0.221 |
| 26   | HARB     | 138    | vbus |  | 1.013   | 0.77   | 24   | 0.221 |
| 26   | ADELSVC  | 500    | vbug |  | 1.031   | 0.872  | 15.4 | 0.221 |

LOWEST FREQUENCY

| AREA | BUS NAME | BUS KV | TYPE |  | MaxDip | @time |
|------|----------|--------|------|--|--------|-------|
| 26   | WLMNTNLD | 138    | fbul |  | 59.452 | 0.067 |
| 26   | HARB     | 138    | fbus |  | 59.452 | 0.067 |

|    |        |      |      |  |        |       |  |  |
|----|--------|------|------|--|--------|-------|--|--|
| 26 | HARB1G | 13.8 | fbug |  | 59.452 | 0.067 |  |  |
|----|--------|------|------|--|--------|-------|--|--|

20. Adelanto-Market Place 500 kV, fault on Adelanto

No violations

HIGHEST VOLTAGE DIP

| AREA | BUS NAME | BUS KV | TYPE |  | Initial | MaxDip | Prct | @time |
|------|----------|--------|------|--|---------|--------|------|-------|
| 26   | WLMNTNLD | 138    | vbul |  | 1.013   | 0.765  | 24.5 | 0.213 |
| 26   | HARB     | 138    | vbus |  | 1.013   | 0.765  | 24.5 | 0.213 |
| 26   | ADELSVC  | 500    | vbug |  | 1.031   | 0.852  | 17.3 | 0.213 |

LOWEST FREQUENCY

| AREA | BUS NAME | BUS KV | TYPE |  | MaxDip | @time |
|------|----------|--------|------|--|--------|-------|
| 26   | WLMNTNLD | 138    | fbul |  | 59.451 | 0.067 |
| 26   | HARB     | 138    | fbus |  | 59.451 | 0.067 |
| 26   | HARB1G   | 13.8   | fbug |  | 59.451 | 0.067 |

21. Midway-Vincent 500 kV double-line outage, fault on Vincent

No violations

HIGHEST VOLTAGE DIP

| AREA | BUS NAME | BUS KV | TYPE |  | Initial | MaxDip | Prct | @time |
|------|----------|--------|------|--|---------|--------|------|-------|
| 30   | LEBEC    | 70     | vbul |  | 0.934   | 0.754  | 19.3 | 0.221 |
| 30   | WND GPT2 | 230    | vbus |  | 0.975   | 0.793  | 18.7 | 0.221 |
| 24   | BOREL    | 66     | vbug |  | 0.999   | 0.84   | 16   | 0.221 |

LOWEST FREQUENCY

| AREA | BUS NAME | BUS KV | TYPE |  | MaxDip | @time |
|------|----------|--------|------|--|--------|-------|
| 24   | LCIENEGA | 66     | fbul |  | 59.43  | 0.054 |
| 24   | TAP 62   | 66     | fbus |  | 59.491 | 0.042 |
| 24   | PEARBMAP | 13.2   | fbug |  | 59.28  | 0.042 |

22. Mc Cullough-Victorville 500 kV, fault on Mc Cullough

No violations. Voltage violations shown in the table is delayed voltage recovery.

VOLTAGE CRITERIA VIOLATIONS

| AREA | BUS NAME | BUS KV | TYPE |  | Initial | MaxDip | Prct | @time |
|------|----------|--------|------|--|---------|--------|------|-------|
| 26   | WLMNTNLD | 138    | vbul |  | 1.013   | 0.757  | 25.3 | 0.25  |

HIGHEST VOLTAGE DIP

| AREA | BUS NAME | BUS KV | TYPE |  | Initial | MaxDip | Prct | @time |
|------|----------|--------|------|--|---------|--------|------|-------|
| 26   | WLMNTNLD | 138    | vbul |  | 1.013   | 0.757  | 25.3 | 0.25  |

LOWEST FREQUENCY

| AREA | BUS NAME | BUS KV | TYPE |  | MaxDip | @time |
|------|----------|--------|------|--|--------|-------|
| 26   | WLMNTNLD | 138    | fbus |  | 59.325 | 0.067 |
| 26   | HARB     | 138    | fbus |  | 59.325 | 0.067 |
| 26   | HARB1G   | 13.8   | fbug |  | 59.325 | 0.067 |

23. Loss of two Palo Verde generators, no fault

No violations

HIGHEST VOLTAGE DIP

| AREA | BUS NAME | BUS KV | TYPE |  | Initial | MaxDip | Prct | @time |
|------|----------|--------|------|--|---------|--------|------|-------|
| 40   | AHSAHKA  | 115    | vbul |  | 0.997   | 0.937  | 6    | 3.042 |
| 40   | DWORSHAK | 115    | vbus |  | 0.998   | 0.936  | 6.1  | 3.042 |
| 65   | TWCITIES | 69     | vbug |  | 1.034   | 0.978  | 5.4  | 1.129 |

LOWEST FREQUENCY

| AREA | BUS NAME | BUS KV | TYPE |  | MaxDip | @time |
|------|----------|--------|------|--|--------|-------|
| 54   | AURORA 8 | 69     | fbus |  | 59.729 | 2.742 |
| 54   | SYNC_D08 | 69     | fbus |  | 59.73  | 2.742 |
| 54   | SYNC_G19 | 13.2   | fbug |  | 59.722 | 2.742 |

24. Loss of PDCI, no fault

No violations

HIGHEST VOLTAGE DIP

| AREA | BUS NAME | BUS KV | TYPE |  | Initial | MaxDip | Prct | @time |
|------|----------|--------|------|--|---------|--------|------|-------|
| 40   | LYLE     | 115    | vbul |  | 1.037   | 1.015  | 2.1  | 2.042 |
| 40   | CELILO3  | 230    | vbus |  | 1.063   | 1.038  | 2.3  | 2.042 |
| 40   | PARKDALE | 230    | vbug |  | 1.05    | 1.028  | 2.1  | 2.042 |

LOWEST FREQUENCY

| AREA | BUS NAME | BUS KV | TYPE |  | MaxDip | @time |
|------|----------|--------|------|--|--------|-------|
| 54   | AURORA 8 | 69     | fbus |  | 59.94  | 4.667 |
| 50   | KMOCT3   | 13.8   | fbus |  | 59.938 | 1.654 |
| 50   | KMO G8   | 13.8   | fbug |  | 59.936 | 1.654 |

25. Paloverde-Devers 500 kV single line outage, fault on Palo Verde

Voltage violations at 3 buses

VOLTAGE CRITERIA VIOLATIONS

| AREA | BUS NAME | BUS KV | TYPE | Initial | MaxDip | Prct | @time | Cycles | From  | To    |
|------|----------|--------|------|---------|--------|------|-------|--------|-------|-------|
| 26   | HALLDALE | 138    | vbul | 1.015   |        |      |       | 20.2   | 0.438 | 0.775 |
| 26   | WLMNTNLD | 138    | vbul | 1.013   |        |      |       | 22.5   | 0.438 | 0.813 |
| 26   | HARBOR   | 138    | vbul | 1.012   |        |      |       | 20.2   | 0.438 | 0.775 |

HIGHEST VOLTAGE DIP

| AREA | BUS NAME | BUS KV | TYPE | Initial | MaxDip | Prct | @time    |
|------|----------|--------|------|---------|--------|------|----------|
| 26   | WLMNTNLD | 138    | vbul | 1.013   | 0.768  | 24.2 | 0.625 26 |
| 26   | HARB     | 138    | vbus | 1.013   | 0.768  | 24.2 | 0.625 26 |
| 24   | DEVERS   | 500    | vbug | 1.043   | 0.804  | 23   | 0.513 24 |

LOWEST FREQUENCY

| AREA | BUS NAME | BUS KV | TYPE | MaxDip | @time    |
|------|----------|--------|------|--------|----------|
| 24   | INDIAN W | 115    | fbul | 59.578 | 0.054 24 |
| 24   | TAP805   | 115    | fbus | 59.579 | 0.054 24 |
| 24   | ESRP P1  | 6.9    | fbug | 59.565 | 0.067 24 |

26. Serrano-Miraloma 500 kV single line outage, fault on Serrano

No violations

HIGHEST VOLTAGE DIP

| AREA | BUS NAME | BUS KV | TYPE | Initial | MaxDip | Prct | @time |
|------|----------|--------|------|---------|--------|------|-------|
| 26   | WLMNTNLD | 138    | vbul | 1.013   | 0.881  | 13.1 | 0.221 |
| 26   | HARB     | 138    | vbus | 1.013   | 0.881  | 13.1 | 0.221 |
| 24   | OLINDA   | 66     | vbug | 1.023   | 0.916  | 10.4 | 0.221 |

LOWEST FREQUENCY

| AREA | BUS NAME | BUS KV | TYPE | MaxDip | @time |
|------|----------|--------|------|--------|-------|
| 24   | LCIENEGA | 66     | fbul | 59.523 | 0.054 |
| 24   | TAP 84   | 66     | fbus | 59.695 | 0.054 |
| 24   | MOBGEN   | 13.8   | fbug | 59.553 | 0.054 |

27. Serrano-Valley 500 kV single line outage, fault on Valley

Frequency violations on Valley, unacceptable frequency dip with the fault

HIGHEST VOLTAGE DIP

| AREA | BUS NAME | BUS KV | TYPE |  | Initial | MaxDip | Prct | @time |
|------|----------|--------|------|--|---------|--------|------|-------|
| 24   | VALLEY-S | 115    | vbul |  | 1.026   | 0.946  | 7.8  | 0.221 |
| 24   | SANBRDNO | 230    | vbus |  | 1.016   | 0.954  | 6.1  | 0.221 |
| 24   | VALLEYSC | 500    | vbug |  | 1.05    | 0.973  | 7.3  | 0.221 |

LOWEST FREQUENCY

| AREA | BUS NAME | BUS KV | TYPE |  | MaxDip | @time |
|------|----------|--------|------|--|--------|-------|
| 24   | VALLEY-S | 115    | fbul |  | 57.799 | 0.067 |
| 24   | VALLEY4T | 13.8   | fbus |  | 57.799 | 0.067 |
| 24   | ESRP P2  | 6.9    | fbug |  | 59.504 | 0.067 |

FREQUENCY LESS THAN 59.6

| AREA | BUS NAME | BUS KV | TYPE |  | Cycles | From  | To    |
|------|----------|--------|------|--|--------|-------|-------|
| 24   | VALLEY-S | 115    | fbul |  | 10     | 0.017 | 0.183 |

28. Lugo-Serrano 500 kV single line outage, fault on Serrano

No violations

HIGHEST VOLTAGE DIP

| AREA | BUS NAME | BUS KV | TYPE |  | Initial | MaxDip | Prct | @time |
|------|----------|--------|------|--|---------|--------|------|-------|
| 26   | WLMNTNLD | 138    | vbul |  | 1.013   | 0.876  | 13.5 | 0.221 |
| 26   | HARB     | 138    | vbus |  | 1.013   | 0.876  | 13.5 | 0.221 |
| 24   | OLINDA   | 66     | vbug |  | 1.023   | 0.913  | 10.7 | 0.221 |

LOWEST FREQUENCY

| AREA | BUS NAME | BUS KV | TYPE |  | MaxDip | @time |
|------|----------|--------|------|--|--------|-------|
| 24   | LCIENEGA | 66     | fbul |  | 59.523 | 0.054 |
| 24   | TAP 84   | 66     | fbus |  | 59.695 | 0.054 |
| 24   | MOBGEN   | 13.8   | fbug |  | 59.553 | 0.054 |

29. Loss of two San Onofre generators, no fault

No violations

HIGHEST VOLTAGE DIP

| AREA | BUS NAME | BUS KV | TYPE |  | Initial | MaxDip | Prct | @time |
|------|----------|--------|------|--|---------|--------|------|-------|
| 22   | PRCTRVLY | 138    | vbul |  | 1.01    | 0.939  | 7.1  | 0.342 |
| 22   | MIGUEL   | 500    | vbus |  | 1.032   | 0.955  | 7.5  | 0.304 |
| 22   | SWEETWTR | 69     | vbug |  | 1.026   | 0.954  | 7    | 0.342 |

LOWEST FREQUENCY

| AREA | BUS NAME | BUS KV | TYPE |  | MaxDip | @time |
|------|----------|--------|------|--|--------|-------|
| 22   | BORREGO  | 69     | fbul |  | 59.826 | 0.042 |
| 22   | NARROWS  | 69     | fbus |  | 59.829 | 0.042 |

|    |        |    |      |  |        |       |
|----|--------|----|------|--|--------|-------|
| 22 | RINCON | 69 | fbug |  | 59.837 | 0.042 |
|----|--------|----|------|--|--------|-------|

### 30. Hassyampa-North Gila 500 kV outage, fault on Hassyampa

The system is unstable. Voltage and frequency violations not shown because they are on all the buses. Stability run diverged after 1.5 second

#### HIGHEST VOLTAGE DIP

| AREA | BUS NAME | BUS KV | TYPE | Initial | MaxDip | Prct | @time |
|------|----------|--------|------|---------|--------|------|-------|
| 26   | RINALDI  | 230    | vbul | 1.046   | 0.023  | 97.8 | 1.075 |
| 24   | CHINO    | 230    | vbus | 1.002   | 0.007  | 99.3 | 1.075 |
| 14   | WLTNMOHK | 161    | vbug | 1.02    | 0.037  | 96.4 | 1.225 |

#### LOWEST FREQUENCY

| AREA | BUS NAME | BUS KV | TYPE | MaxDip | @time |
|------|----------|--------|------|--------|-------|
| 26   | RINALDI  | 230    | fbul | 28.92  | 1.113 |
| 26   | VALLEY   | 230    | fbus | 29.077 | 1.113 |
| 26   | VALLYRP1 | 18     | fbug | 29.077 | 1.113 |

### 31. Paloverde-Devers, Harquahala-Devers 500 kV double line outage, fault on Palo Verde

The system is unstable. Voltage and frequency violations not shown because they are on all the buses. Stability run diverged after 1.5 second.

#### HIGHEST VOLTAGE DIP

| AREA | BUS NAME | BUS KV | TYPE | Initial | MaxDip | Prct | @time |
|------|----------|--------|------|---------|--------|------|-------|
| 24   | EAGLROCK | 66     | vbul | 1.061   | 0.008  | 99.3 | 1.058 |
| 24   | EAGLROCK | 230    | vbus | 1.033   | 0.008  | 99.2 | 1.058 |
| 24   | KERNRVR  | 66     | vbug | 1.024   | 0.06   | 94.2 | 1.263 |

#### LOWEST FREQUENCY

| AREA | BUS NAME | BUS KV | TYPE | MaxDip | @time |
|------|----------|--------|------|--------|-------|
| 26   | WLMNTNLD | 138    | fbul | 33.949 | 1.525 |
| 26   | HARB     | 138    | fbus | 33.949 | 1.525 |
| 26   | HARB1G   | 13.8   | fbug | 33.949 | 1.525 |

### 32. Perkins-Westwing double line outage, fault on Westwing

No violations

HIGHEST VOLTAGE DIP

| AREA | BUS NAME | BUS KV | TYPE | Initial | MaxDip | Prct | @time |
|------|----------|--------|------|---------|--------|------|-------|
| 24   | VALLEY-S | 115    | vbul | 1.026   | 0.94   | 8.4  | 0.258 |
| 24   | DEVERS   | 230    | vbus | 1.019   | 0.933  | 8.5  | 0.258 |
| 24   | DEVERS   | 500    | vbug | 1.043   | 0.936  | 10.2 | 0.296 |

LOWEST FREQUENCY

| AREA | BUS NAME | BUS KV | TYPE | MaxDip | @time |
|------|----------|--------|------|--------|-------|
| 24   | PADUA    | 66     | fbul | 59.765 | 0.067 |
| 24   | ETI MWD  | 66     | fbus | 59.798 | 0.067 |
| 24   | ESRP P1  | 6.9    | fbug | 59.755 | 0.067 |

33. Paloverde-Westwing double line outage, fault on Paloverde

No violations. Devers 500 kV is not a load bus.

VOLTAGE CRITERIA VIOLATIONS

| AREA | BUS NAME      | BUS KV     | TYPE | Initial | MaxDip | Prct        | @time | Cycles | From | To |
|------|---------------|------------|------|---------|--------|-------------|-------|--------|------|----|
| 24   | <b>DEVERS</b> | <b>500</b> | vbug | 1.043   | 0.718  | <b>31.2</b> | 0.51  |        |      |    |

HIGHEST VOLTAGE DIP

| AREA | BUS NAME | BUS KV | TYPE | Initial | MaxDip | Prct | @time |
|------|----------|--------|------|---------|--------|------|-------|
| 24   | VALLEY-S | 115    | vbul | 1.026   | 0.761  | 25.9 | 0.55  |
| 24   | DEVERS   | 230    | vbus | 1.019   | 0.75   | 26.4 | 0.55  |
| 24   | DEVERS   | 500    | vbug | 1.043   | 0.718  | 31.2 | 0.513 |

LOWEST FREQUENCY

| AREA | BUS NAME | BUS KV | TYPE | MaxDip | @time |
|------|----------|--------|------|--------|-------|
| 24   | INDIAN W | 115    | fbul | 59.586 | 0.054 |
| 24   | TAP805   | 115    | fbus | 59.587 | 0.054 |
| 50   | KMO G8   | 13.8   | fbug | 59.571 | 3.025 |

34. Paloverde-Westwing single line outage, fault on Paloverde

No violations

HIGHEST VOLTAGE DIP

| AREA | BUS NAME | BUS KV | TYPE | Initial | MaxDip | Prct | @time |
|------|----------|--------|------|---------|--------|------|-------|
| 24   | VALLEY-S | 115    | vbul | 1.026   | 0.852  | 17   | 0.325 |

|    |        |     |      |  |       |       |      |       |
|----|--------|-----|------|--|-------|-------|------|-------|
| 24 | DEVERS | 230 | vbus |  | 1.019 | 0.844 | 17.2 | 0.325 |
| 24 | DEVERS | 500 | vbug |  | 1.043 | 0.832 | 20.2 | 0.325 |

LOWEST FREQUENCY

| AREA | BUS NAME | BUS KV | TYPE |  | MaxDip | @time |
|------|----------|--------|------|--|--------|-------|
| 24   | INDIAN W | 115    | fbul |  | 59.586 | 0.054 |
| 24   | TAP805   | 115    | fbus |  | 59.587 | 0.054 |
| 24   | ESRP P1  | 6.9    | fbug |  | 59.574 | 0.067 |